

CLAIMS

What is claimed is:

1. A clock shaping device, provided in a transmission apparatus and compensating for network synchronization, for receiving an input of a back-up clock signal in sync with a reference clock signal from a master station or a quasi-master station and supplied from a clock supply apparatus and an input of reception data from a transmission path, and generating a reception clock signal through timing-extraction from said reception data, said device being characterized by comprising:

a first clock signal selection portion that receives an input of said reception clock signal and an input of said back-up clock signal, selects either of said clock signals by a first selection signal inputted from an outside, monitors, when said reception clock signal is being selected, a loss in said selected reception clock signal, and switches said selected reception clock signal to said back-up clock signal upon detection of said loss;

a quartz crystal oscillation circuit that oscillates at a predetermined frequency;

a second clock signal selection portion that receives an input of a clock signal from said first clock signal selection portion and an input of a clock signal from said quartz crystal oscillation circuit, selects either of said clock signals by a second selection signal inputted from an outside, monitors, when said back-up clock signal is being selected, a loss in said selected back-up clock signal, and switches said back-up clock signal to said clock signal from said quartz crystal oscillation circuit upon detection of said loss;

a voltage controlled oscillation circuit whose frequency varies with a control voltage being supplied, and generates and outputs a feedback loop output signal;

a phase comparison portion that generates a phase difference signal based on a result of comparison between said feedback loop output signal from said voltage controlled oscillation circuit and a clock signal

outputted from said second clock signal selection portion; and

a loop filter that smoothes said phase difference signal and outputs said phase difference signal in the form of said control voltage.

2. The clock shaping device according to Claim 1, wherein said voltage controlled oscillation circuit includes:

a voltage controlled phase-shift circuit that outputs an output signal by shifting a phase of an input signal by a certain quantity with said control voltage;

a SAW resonator that resonates at a predetermined resonance frequency;

an oscillation differential amplifier that amplifies a resonance signal at said predetermined resonance frequency and outputs said resonance signal; and

a feedback buffer differential amplifier that receives an input of an output signal from said oscillation differential amplifier, and

wherein a forward feedback oscillation loop is formed from at least said voltage controlled phase-shift circuit, said SAW resonator, said oscillation differential amplifier, and said feedback buffer differential amplifier, so that one of an inverting output terminal and a non-inverting output terminal provided to said feedback buffer differential amplifier outputs said feedback loop output signal and the other output terminal outputs a forward feedback oscillation loop output signal.

3. The clock shaping device according to Claim 1, wherein said voltage controlled oscillation circuit includes:

a voltage controlled phase-shift circuit that outputs an output signal by shifting a phase of an input signal by a certain quantity with said control voltage;

a SAW resonator that resonates at a predetermined resonance frequency;

an oscillation amplifier that amplifies a resonance signal at said

predetermined resonance frequency and outputs said resonance signal;

and

a feedback buffer amplifier that receives an input of an output signal from said oscillation amplifier, and

wherein:

a forward feedback oscillation loop is formed from at least said voltage controlled phase-shift circuit, said SAW resonator, said oscillation amplifier, and said feedback buffer amplifier;

plural output amplifiers are further included; and
an output signal from said oscillation amplifier is branched via said plural output amplifiers, and any one of output signals is used as said feedback loop output signal.

4. The clock shaping device according to Claim 1, wherein
said first clock signal selection portion includes:

a first selection portion that receives an input of said reception

clock signal and an input of said back-up clock signal, and selects and outputs either of said clock signals by said first selection signal;

a reception clock signal loss detection portion that detects a loss in said reception clock signal when said reception clock signal is being selected in said first selection portion, and outputs said detection to said first selection portion in the form of a first switching signal, and

wherein said first clock signal selection portion switches said reception clock signal to said back-up clock signal by said first switching signal given with precedence over said first selection signal.

5. The clock shaping device according to Claim 1, wherein said second clock signal selection portion includes:

a second selection portion that receives an input of a clock signal outputted from said first clock signal selection portion and an input of a clock signal outputted from said quartz crystal oscillation circuit, and selects and outputs either of said clock signals by said second selection

signal; and

a back-up clock signal loss detection portion that detects a loss in said back-up clock signal when said back-up clock signal is being selected in said second selection portion, and outputs said detection to said second selection portion in the form of a second switching signal, and

wherein said second clock signal selection portion switches said back-up clock signal to said clock signal from said quartz crystal oscillation circuit by said second switching signal given with precedence over said second selection signal.

6. The clock shaping device according to Claim 1, wherein said phase comparison portion includes:

first dividing means for dividing a clock signal selected by said second clock signal selecting means; and

second dividing means for dividing said feedback loop output signal.

7. The clock shaping device according to Claim 2, wherein:

each of said oscillation differential amplifier and said feedback buffer differential amplifier is a differential amplifier circuit using an ECL line receiver.

8. An electronic instrument, characterized by being provided with the clock shaping device according to any of Claims 1 through 7.